

RESERVE COPY PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in or relating to a Method of Sealing a Hollow Body at a Predetermined Point.

We, SIMCA AUTOMOBILES, a French Body Corporate, of 136 Champs Elysees, Paris 8eme, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a method of sealing a hollow body at a predetermined point.

In the present state of the art of thermal insulation, polyurethane foam is used in order to fill hollow bodies.

However, in order to use such a foam, it has been customary to pack it in a bag and then locate the filled bag at the desired place during manufacture, before the hollow body is closed, and this tends completely to fill the free space between the walls of said body.

According to another known method, constituents for forming a polyurethane foam are directly injected between the walls of the hollow body, so as completely to fill the internal space with a cellular foam.

However, these methods do not enable a substance of reduced volume to be arranged at a predetermined spot, as would be desirable in the body of a car, in order to counteract sound pipe effects in sound insulation procedure and to form a seal against dust for certain parts.

To this end and in accordance with the invention a bag which will contain a rigid foam may be arranged at any suitable spot within a hollow body, by making a small aperture in one of the walls of said body, having a diameter which is sufficiently large for introducing the empty bag and by injecting into this bag a liquid composition

whose components react together so as to form a foam, particularly polyurethane, intended to fill a certain space of the hollow body.

Accordingly, the invention consists in a method of sealing a hollow body, comprising the steps of introducing a bag through an opening in a wall of said body, passing into said bag from outside said body, a mixture of materials which will react chemically to subsequently expand, closing said bag from the outside passing the bag wholly within the hollow body and allowing the expansible mixture in said bag to expand to seal off said hollow body.

The materials admitted to the bag may comprise a polymerisable material, a cross-linking agent, and a blowing agent, all capable of reacting chemically to expand to form a closed-cell foam structure.

The polymerisable material may be a resin, the cross-linking agent an isocyanate, and the foamed material formed by the action, a polyurethane.

The isocyanate may be in the form of a di-isocyanate such as toluene di-isocyanate, or a polyisocyanate insofar as this latter term does not include a di-isocyanate.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings, which show one example of the method according thereto, by way of example and in which:—

Figure 1 shows a sectional view of a hollow body during the introduction of the empty bag,

Figure 2 shows a sectional view showing the introduction of a predetermined quantity of the mixture,

Figure 3 shows a sectional view showing

the bag when it is in place and the material has partially expanded, and

Figure 4 shows a sectional view showing the bag after complete expansion of the cellular mass.

Referring now to the drawings; in Figure 1 in a hollow body 1 which may be constituted by any part of a car and one wall 2 of which has an aperture 3 therein which has a diameter which is sufficiently large for a bag 4 to be introduced, when the latter is empty. This aperture 3 is made near the location in the hollow body where it is desired to fit a sealing element. A steel plate 5 is fixed against the wall 2 of the hollow body, is provided to support the bag 4 during the above described injection operation.

In Figure 2, which shows the introduction of the bag 4 into the hollow body 1, the liquid mixture is introduced therein through its open end 6 which projects out of the aperture, by means of an injection member 7. The liquid mixture is constituted for example by a resin and a polyisocyanate or any other suitable polymerisable material plus an isocyanate plus a blowing agent, measured in predetermined quantities so that they react together in order to form a closed-cell polyurethane foam structure whose formation is accelerated by the blowing or foaming agent incorporated in the isocyanate.

In Figure 3, which shows the parts after the filling operation is finished, the end 6 of the bag 4 is sealed by any known means and as a knot 8 made by means of a knot or a heat weld, the end 6 of the bag is then pushed back into the hollow body through the aperture 3. In this position, the bag 4 is completely contained within the hollow body 1 and sits on the steel plate 5.

After a very short time, the mixture injected into the bag 4 reacts completely, and the bag expands to form a closed-cell structure e.g. of a polyurethane foam, which completely fills the internal part of the hollow body, at the predetermined spot as shown in Figure 4. It is then sufficient to seal the aperture 3 with a stopper 9 which may particularly be made of a plastics material.

The steel plate 5 may be replaced by a folded adhesive band, whose two ends are glued respectively on the neck of the bag 4 and on the external surface of the wall 2 of the hollow body 1.

The nature of the material utilised has specifically been referred to as a polyurethane foam, but it is understood that any other type of product could be used, formed

by an expansion process similar to that described.

The composition used for obtaining the polyurethane foam in the bag 4 can be:—

- | | |
|------------------------------|-----------|
| 1. Polyester Daltolac 41 ... | 100 parts |
| 2. Isocyanate Suprasec D ... | 85 parts |
| 3. Darcton 11 | 20 parts |

All these materials are marketed by Imperial Chemical Industries.

The polyurethane foam is obtained by mixing of the polyester and the isocyanate, the Darcton 11 being used only for reducing the polymerisation temperature and favouring the development of the foam in the cavity which it must fill up.

WHAT WE CLAIM IS:—

1. A method of sealing a hollow body, comprising the steps of introducing a bag through an opening in a wall of said body, passing into said bag from outside said body, a mixture of materials which will react chemically to subsequently expand, closing said bag from the outside, passing the bag wholly within the hollow body and allowing the expansible mixture in said bag to expand to seal off said hollow body.

2. A method as claimed in claim 1, wherein the materials admitted to the bag comprise a polymerisable material, a cross-linking agent, and a blowing agent, all capable of reacting chemically to expand to form a closed-cell foam structure.

3. A method as claimed in Claim 2, wherein the polymerisable material is a resin, the cross-linking agent is an isocyanate and the foamed material formed by the action is a polyurethane.

4. A method as claimed in Claim 3, wherein the isocyanate is a polyisocyanate.

5. A method as claimed in any one of the preceding claims, wherein the bag is supported by a plate fixed to a wall of said body to project therefrom.

6. A method as claimed in any one of the preceding claims 1 to 4, wherein an adhesive tape is secured to the neck of the bag and to the external part of said wall of the hollow body, to support the bag within the body.

7. A method of sealing a hollow body substantially as hereinbefore described with reference to the accompanying drawings.

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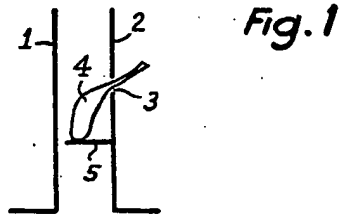


Fig. 1

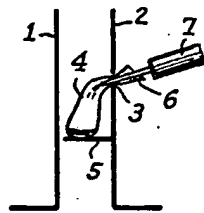


Fig. 2

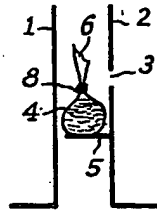


Fig. 3

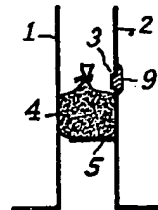


Fig. 4